Cholinesterases as biomarkers for parasympathetic dysfunction and inflammation-related disease.

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Abstract:

Accumulating evidence suggests parasympathetic dysfunction and elevated inflammation as underlying processes in multiple peripheral and neurological diseases. Acetylcholine, the main parasympathetic neurotransmitter and inflammation regulator, is hydrolyzed by the two closely homologous enzymes, acetylcholinesterase and butyrylcholinesterase (AChE and BChE, respectively), which are also expressed in the serum. Here, we consider the potential value of both enzymes as possible biomarkers in diseases associated with parasympathetic malfunctioning. We cover the modulations of cholinesterase activities in inflammation-related events as well as by cholinesterase-targeted microRNAs. We further discuss epigenetic control over cholinesterase gene expression and the impact of single-nucleotide polymorphisms on the corresponding physiological and pathological processes. In particular, we focus on measurements of circulation cholinesterases as a readily quantifiable readout for changes in the sympathetic/parasympathetic balance and the implications of changes in this readout in health and disease. Taken together, this cumulative know-how calls for expanding the use of cholinesterase activity measurements for both basic research and as a clinical assessment tool.

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